UTILITY PATENT APPLICATION TRANSMITTAL

Address to:	Attorney Docket No.	
Box PATENT APPLICATION **Assistant Commissioner for Patents** **Washington, DC 20231**	USW#1674	
	Inventors(s) or Application Identifier: Donald E. Gillespie; Jafkar Nabkel; Harvey J. Benson; Karen Siegel-Jacobs; Edward A. Youngs	

1.   This application entitled <u>METHOD AND SYSTEM FOR PROVIDING LOCATION-SENSITIVE CALL MANAGEMENT SERVICES TO A MOBILE SUBSCRIBER</u> is:

    a.   __X__ A new application under 37 C.F.R. § 1.53(b).

    b.   ____ A ____continuation ____divisional or ____continuation-in-part application under 37 C.F.R. § 1.53(b) of prior application Serial No. ____/_____ filed on _____, entitled _____.

Application elements and other attached papers:

2.   __X__ Specification (incl. Claims and Abstract)   [Total Pages 17]

3.   __X__ Drawings (____ informal __X__ formal)   [Total Sheets__2__]

4.   __X__ Oath or Declaration and Power of Attorney

    a.   __X__ Newly-executed

    b.   ____ Copy from a prior application (37 C.F.R. § 1.63(d))

5.   ____ Incorporation By Reference: The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Item 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6.   ____ This application is filed by fewer than all the inventors named in the prior application, 37 C.F.R. § 1.53(d)(4).

    a.   ____ *DELETE* the following inventor(s) named in the prior nonprovisional application:_____

    b.   ____ The inventor(s) to be deleted are set forth on a separate sheet attached hereto.

CERTIFICATION UNDER 37 C.F.R. § 1.10

I hereby certify that this UTILITY PATENT APPLICATION TRANSMITTAL and the documents referred to as attached therein are being deposited on the below date with the United States Postal Service in an envelope as "Express Mail Post Office to Addressee" addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

Express
Mail Label No.:____EJ1046711772US____   ____Laura L. Acx____
                                               (Type or print name of person mailing paper)

Date of Deposit: _November 18, 1999_   _Laura L. Acx_

UTILITY PATENT APPLICATION TRANSMITTAL

PATENT TRADEMARK OFFICE

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Express Mail Label No.:_____EJ1046711772US_____

Date of Deposit: Nevember 18,1999

Laura L. Acx
(Type or print name of person mailing paper)

Laura L. Acx

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22193

PATENT TRADEMARK OFFICE

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Respectfully submitted,

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Registration No.: 37,887

___X___ Attorney or agent of record
_____ Filed under Rule 34(a)

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METHOD AND SYSTEM FOR PROVIDING
LOCATION-SENSITIVE CALL MANAGEMENT
SERVICES TO A MOBILE SUBSCRIBER

Technical Field

5

This invention relates to methods and systems for providing location-sensitive call

management services to a mobile subscriber.

Background Art

10

With the emerging wireless networks and increased participation in wireless

communications, new features are continually developed and made available to mobile phone

subscribers. For example, one-number services allow subscribers to be reached wherever they

physically are as long as they are in the vicinity of either their wireline telephone or their mobile

phone. This feature allows the mobile phone to be used for both personal and work purposes.

15 However, this continuous, or uninterrupted, communications may result in excessive calls to

some subscribers thereby encroaching on their personal or work life.

It would be desirable, however, to manage calls to a mobile subscriber based on their

current geographic location. For example, it may be desirable to prohibit preselected originating

calls to a mobile phone when the subscriber is at, or near, their residence.

20

Summary Of The Invention

It is a general object of the present invention to provide location-sensitive call

management services to a mobile subscriber.

In carrying out the above object and other objects, features, and advantages of the present invention, a method is provided for processing communication services for a mobile subscriber associated with a wireless network. The method includes defining location-dependent rules associated with at least one communication service subscribed to by the mobile subscriber, determining a current location of the mobile subscriber, and processing the communication services based on the location-dependent rules and the location of the mobile subscriber.

In further carrying out the above object and other objects, features, and advantages of the present invention, a system is also provided for carrying out the steps of the above described method. The system includes a database for storing location-dependent rules associated with at least one communication service subscribed to by the mobile subscriber. The system further includes service logic in communication with the database for determining the current location of the subscriber and generating call processing instructions based on the location-dependent rules and the current location of the mobile subscriber.

The above object and other objects, features and advantages of the present invention are readily apparent from the following detailed description of the best mode for carrying out the invention when taken in connection with the accompanying drawings.

Brief Description Of The Drawings

FIGURE 1 is a schematic diagram of an interactive wireline and wireless network system architecture incorporating the teachings of the present invention; and

FIGURE 2 is a flow diagram illustrating the general sequence of steps associated with the method of the present invention.

Best Modes For Carrying Out The Invention

A schematic diagram of the system architecture of an interactive wireline and wireless network incorporating the teachings of the present invention is shown in Figure 1. The wireless network 20 typically includes a Mobile Switching Center (MSC) 22 for processing calls to and from the wireless users of the wireless network 20. MSC 22 is known to those skilled in the art as a digital telephone exchange that controls the switching between a wireline network 30 and mobile cell sites for all wireline-to-mobile, mobile-to-wireline, and mobile-to-mobile calls. In operation, when MSC 22 receives a call from the wireline network 30 that is directed to a wireless handset 24, MSC 22 deciphers the telephone number dialed by the originating caller and alerts Base Station Controllers (BSCs) 26 (described below) at one or more cell sites to page the corresponding wireless handset 24. Similarly, when wireless handset 24 places a call, MSC 22 accepts the dialing data from BSC 26 and uses the desired number for routing the communication. MSC 22 also processes mobile registration status data received from BSC 26, switches calls to other cells, processes diagnostic information, and compiles mobile billing information.

Typical wireless networks include several coverage areas each including multiple adjoining cells. The BSC 26, which operates under the direction of MSC 22, serves each coverage area via a plurality of Base Stations (BSs) 28 disposed throughout each of the adjoining cells. The BSC 26 manages each of the radio channels assigned to its coverage area, supervises calls, turns the radio transceivers on and off, injects data onto control and user channels, and

performs diagnostic tests on the cell site equipment. The BSs 28 communicate with the BSC 26

utilizing a base station protocol such as IS-634.

To register a subscriber in the wireless network 20, MSC 22 ascertains whether a

subscriber is present in the wireless network when the subscriber places a call via the wireless

handset 24, receives a call via the wireless handset 24, or by automatic registration. Specifically,

each time wireless handset 24 is powered on or a call is originated from wireless handset 24,

certain information is transmitted to MSC 22, including a Mobile Identification Number (MIN),

an Electronic Serial Number (ESN), and a System Identification (SID) of the wireless handset 24.

In order to respond to subscriber call requests, the MSC 22 compares the information

transmitted by the wireless handset 24 with subscriber data contained in a database, referred

to as a Wireless Service Location Register (WSLR) 29. The WSLR 29 is a master database for

storing data related to each mobile subscriber, such as the subscriber profile and mobility

information together with their relevant permanent (static) data, such as access capabilities and

subscriber services. WSLR 29 also contains location and service data for each visiting subscriber

entering its coverage area in order to route incoming and outgoing calls appropriately. The

WSLR 29 performs substantially the same functionality as the well known Home Location

Register and Wireless Service Control Point, yet serves one or more MSCs 22 rather than only

one MSC 22, as traditionally done in the prior art.

MSC 22 and WSLR 29 communicate with each other utilizing a signaling protocol, such

as IS-41 Mobile Application Part (MAP) or GSM MAP. In some implementations, MSC 22 and

WSLR 29 may be integrated into one component.

The MSC 22 of the wireless network 20 is typically connected to an equivalent wireline switch 34 in the wireline network 30 via trunk circuits 32. The wireline switch 34 is typically a Service Switching Point (SSP), as will be described in greater detail below. The wireline network 30 typically consists of a number of switches and application processors interconnected by transmission circuits to serve a plurality of wireline telephones 36. Common Channel Signaling, such as Signaling System No. 7 (SS7), is a signaling method in which a signaling channel conveys, by means of labeled messages, signaling information relating to call setup, control, network management, and network maintenance. The SS7 network exists within the wireline network 30 and controls it accordingly. SS7 achieves this control by creating and transferring call processing, network management and maintenance messages to the network's various components.

An SS7 network has three distinct components, SSPs 34, Signal Transfer Points (STPs) 38, and Service Control Points (SCPs) 40. SSP 34 performs call processing on calls that originate, tandem, or terminate at that site. As part of this call processing, SSP 34 may generate SS7 messages to transfer call-related information to other SSPs, or to send a query to SCP 40 for instructions on how to route a call.

STP 38 is a switch that relays messages between network switches and databases. The main function of STP 38 is to route SS7 messages to the correct outgoing signaling link based on information contained in the SS7 message address fields. SCP 40 contains centralized network databases for providing enhanced services. The SCP 40 accepts queries from an SSP 34 and returns the requested information to the originator of the query.

Turning now to Figure 2, there is shown a flow diagram illustrating the general sequence of steps associated with the method of the present invention. The method includes the initial step of defining and storing location-dependent rules for a mobile subscriber, as shown at block 50, which are preferably stored in WSLR 29. First, the subscriber defines one or more geographic

5   regions in which the location-dependent rules will apply. This can be accomplished in a number of ways. For example, the subscriber may define an area that changes as the subscriber's location changes. That is, the subscriber may select a geographic region defining a one-kilometer radius circle from the subscriber's current location. This type of dynamic geographic region can be identified by having the subscriber press a predetermined key on the handset 24.

10   Alternatively, the subscriber may define a static geographic region that is independent of the subscriber's location by specifying a radius from a specific point, a latitude/longitude grid, a specific ZIP code, or a census tract. This selection can be accomplished manually by entering a predetermined ZIP code or by using a map over a Web-based Geographic Informations Systems (GIS). Also, the subscriber can also define the region by pressing a key on the handset to

15   identify a radius from the subscriber's current location that remains static, regardless of the position of the subscriber.

Then, the subscriber selects the type of call processing he desires while in each of these regions. For example, when a subscriber is in his/her residential area, the subscriber may want a Do Not Disturb service wherein an announcement is played to all or preselected calling parties

20   stating that the subscriber is unavailable to receive calls at the moment. Or, a subscriber may want his caller identification service to replace his handset's caller identification with the

subscriber's office telephone number when the handset is in the vicinity of the subscriber's office location.

Next, an incoming call is placed to the subscriber or an outgoing call is originated from the subscriber, as shown at block 52, thereby initiating the location-dependent call processing management of the present invention. When incoming calls are placed to the subscriber's handset 24, a signal (e.g., Location Request) is sent from the MSC 22 to the WSLR 29 requesting instructions on how to process the call. Alternatively, when outgoing calls are placed from the subscriber's handset 24, a signal (e.g., Origination Request) is sent from the MSC 22 to the WSLR 29 requesting instructions on how to process the call.

In order to generate the appropriate call processing instructions for MSC 22, WSLR 29 must determine the current location of the subscriber, or handset 24, as shown at block 54. The location of the handset 24 can be either: 1) continuously furnished to the WSLR 29 from either the network or from the handset 24; or 2) provided to the WSLR 29 upon request. The location of the handset 24 can be determined from a variety of techniques including determining a time-offset or signal strength from the handset 24 and performing triangulation of radio signals by the BSs 28 or by using Global Positioning Systems (GPS) receivers (not shown) located in the wireless handsets 24.

An additional feature may be provided in the present invention in which supplemental subscriber information is used to process the call, as shown at block 56. Supplemental subscriber information may include time-of-day or subscriber handset state. Additional information may be application-specific. For example, a package delivery/pick-up service may automatically route incoming calls to the vehicle closest to the calling party. In this example, a vehicle may be in the

correct geographic region, yet be unavailable to deliver or pick-up a package because the vehicle is currently at capacity. In this example, a third-party service provider 42, Figure 1, such as FedEx or UPS, could provide supplemental subscriber information to the location-based call management service through the wireline and wireless networks to the subscriber 24.

5   After determining the location and supplemental information of the subscriber and determining if there are any call processing rules applicable to the location of the subscriber, the call is processed accordingly, as shown at block 58. An example of an incoming call service is where a Do Not Disturb announcement is played when a business subscriber is in the vicinity of his/her home. An example of an outgoing call service is where the subscriber's office telephone number is substituted for the mobile identification number in caller identification services when the subscriber is in the vicinity of his/her office.

While the best modes for carrying out the invention have been described in detail, those familiar with the art to which this invention relates will recognize various alternative designs and embodiments for practicing the invention. For example, the service logic for generating the call processing instructions could be hosted in other locations than the WSLR 29, including, but not limited to, the MSC 22, the SSP 34, the STP 38, the SCP 40 and the third party customer premise equipment 42. Furthermore, various architectures for constructing the wireless network may be possible. In some situations, the functionality of the MSC may be combined with a wireline network switch. In others, the intelligence for routing wireless calls may be distributed

20   to BSCs or other wireless network elements thereby eliminating the MSC as a discrete element. The teachings of this invention may be practiced with these and other embodiments as defined by the following claims.

CLAIMS

What Is Claimed Is:

5   1.   A method for processing communication services for a mobile subscriber associated with a wireless network, the method comprising:

defining location-dependent rules associated with at least one communication service subscribed to by the mobile subscriber;

determining a current location of the mobile subscriber; and

10   processing the communication services based on the location-dependent rules and the current location of the mobile subscriber.

      2.   The method as recited in claim 1 wherein defining the location-dependent rules comprises:

15   defining at least one geographic area associated with the mobile subscriber; and

defining rules for processing the at least one communication service for the mobile subscriber when the mobile subscriber is in the at least one geographic area.

      3.   The method as recited in claim 2 wherein defining the at least one geographic area

20   includes defining a dynamic geographic area dependent on the instantaneous location of the subscriber.

4.   The method as recited in claim 3 wherein defining the dynamic geographic area includes generating a signal indicating a general geographic area dependent on the current location of the subscriber.

5.   The method as recited in claim 2 wherein defining the at least one geographic area includes defining at least one static predetermined geographic area independent of the current location of the subscriber.

6.   The method as recited in claim 5 wherein defining the at least one static geographic area includes selecting a predetermined known geographic area.

7.   The method as recited in claim 5 wherein defining the at least one static geographic area includes defining a general geographic area dependent upon a known geographic location.

8.   The method as recited in claim 1 wherein the wireless network includes at least one base station at a known location for communicating with the mobile subscriber and wherein determining the current location of the mobile subscriber comprises:

receiving a signal from the mobile subscriber; and

determining the location of the mobile subscriber based on the signal from the mobile subscriber and the known location of the at least one base station.

9. The method as recited in claim 8 wherein receiving the signal includes continuously receiving the signal from the wireless subscriber.

10. The method as recited in claim 8 wherein receiving the signal includes receiving the signal from the wireless subscriber in response to a prompt from the wireless network.

11. The method as recited in claim 8 wherein receiving the signal includes receiving a Global Positioning Signal from the mobile subscriber.

12. The method as recited in claim 8 wherein receiving the signal includes receiving a strength of the signal from the mobile subscriber.

13. The method as recited in claim 8 wherein receiving the signal includes receiving signal propagation timing information from the mobile subscriber.

14. The method as recited in claim 1 wherein processing the communication services comprises:

receiving an outgoing call from the mobile subscriber; and

processing the outgoing call based on the location-dependent rules and the current location of the subscriber.

15. The method as recited in claim 1 wherein processing the communication services comprises:

receiving an incoming call for receipt by the mobile subscriber; and

processing the incoming call based on the location-dependent rules and the current

5 location of the subscriber.

16. The method as recited in claim 1 further comprising:

determining supplemental subscriber information from the mobile subscriber; and

wherein processing the communication services further comprises processing the

10 communication services based on the supplemental subscriber information, the current location of

the subscriber and the location-dependent rules.

17.   A system for processing communication services for a mobile subscriber associated with a wireless network, the system comprising:

a database for storing location-dependent rules associated with at least one communication service subscribed to by the mobile subscriber; and

service logic for determining a current location of the mobile subscriber and generating call processing instructions for processing the communication services based on the location-dependent rules and the current location of the mobile subscriber.

18.   The system as recited in claim 17 further comprising an interface for defining at least one geographic area associated with the mobile subscriber and wherein storing the rules includes storing rules for processing the communication services for the mobile subscriber when the mobile subscriber is in the at least one geographic area.

19.   The system as recited in claim 18 wherein the interface, in defining the at least one geographic area, is further operative to define a dynamic geographic area dependent on the instantaneous location of the subscriber.

20.   The system as recited in claim 19 wherein the interface, in defining the dynamic geographic area, is further operative to generate a signal indicating a changing geographic area dependent on the current location of the subscriber.

21.   The system as recited in claim 18 wherein the interface, in defining the at least one geographic area, is further operative to define at least one static predetermined geographic area independent of the current location of the subscriber.

5   22.   The system as recited in claim 21 wherein the interface, in defining the at least one static geographic area, is further operative to allow selection of a predetermined known geographic area.

23.   The system as recited in claim 21 wherein the interface, in defining the at least one

10   static geographic area, is further operative to define a general geographic area dependent upon a known geographic location.

24.   The system as recited in claim 17 wherein the wireless network includes at least one base station at a known location for communicating with the mobile subscriber and wherein

15   the service logic, in determining the current location of the wireless, is further operative to receive a signal from the mobile subscriber, and determine the location of the mobile subscriber based on the signal from the mobile subscriber and the known location of the at least one base station.

20   25.   The system as recited in claim 24 wherein the service logic, in receiving the signal, is further operative to continuously receive the signal from the mobile subscriber.

26.   The system as recited in claim 24 wherein the service logic, in receiving the signal, is further operative to receive the signal from the mobile subscriber in response to a prompt by the service logic.

5

27.   The system as recited in claim 24 wherein the service logic, in receiving the signal, is further operative to receive a Global Positioning Signal from the mobile subscriber.

28.   The system as recited in claim 24 wherein the service logic, in receiving the signal, is further operative to receive a strength of the signal from the mobile subscriber.

10

29.   The system as recited in claim 24 wherein the service logic, in receiving the signal, is further operative to receive signal propagation timing information from the mobile subscriber.

15

30.   The system as recited in claim 17 wherein the service logic, in processing the communication services, is further operative to receive an outgoing call from the mobile subscriber, and process the outgoing call based on the location-dependent rules and the current location of the subscriber.

20

31.   The system as recited in claim 17 wherein the service logic, in processing the communication services, is further operative to receive an incoming call for receipt by the mobile subscriber, and process the incoming call based on the location-dependent rules and the current location of the subscriber.
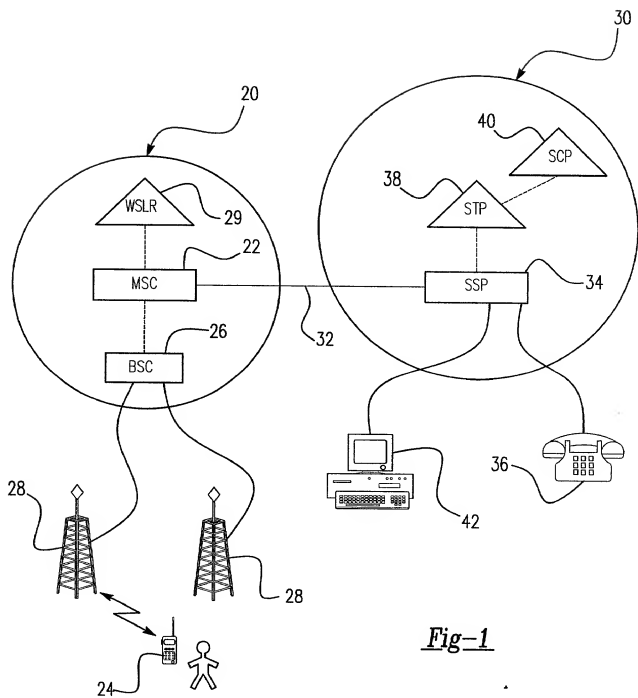
5

32.   The system as recited in claim 17 wherein the service logic is further operative to determine supplemental subscriber information from the mobile subscriber and process the communication services based on the supplemental subscriber information, the current location of the subscriber and the location-dependent rules.

Abstract

A method and system for processing communication services for a mobile subscriber associated with a wireless network includes a database for storing location-dependent rules associated with at least one communication service subscribed to by the mobile subscriber. Service logic then determines a current location of the mobile subscriber and generates call processing instructions for processing the communication services based on the location-dependent rules and the current location of the mobile subscriber.

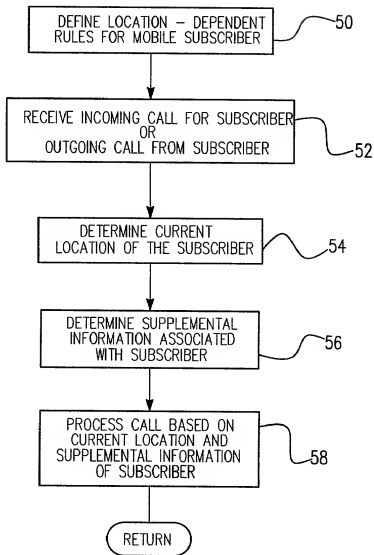G:\T-V\USWest\Ip00002\PATENT\application.doc

Fig-1

```
┌─────────────────────────────────┐
│  DEFINE LOCATION — DEPENDENT    │──────50
│  RULES FOR MOBILE SUBSCRIBER    │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ RECEIVE INCOMING CALL FOR SUBSCRIBER │
│                OR               │
│  OUTGOING CALL FROM SUBSCRIBER  │──────52
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│      DETERMINE CURRENT          │
│   LOCATION OF THE SUBSCRIBER    │──────54
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│    DETERMINE SUPPLEMENTAL        │
│   INFORMATION ASSOCIATED         │──────56
│       WITH SUBSCRIBER            │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│    PROCESS CALL BASED ON         │
│     CURRENT LOCATION AND         │
│  SUPPLEMENTAL INFORMATION        │──────58
│       OF SUBSCRIBER              │
└─────────────────────────────────┘
                 │
                 ▼
            (  RETURN  )
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Fig-2

DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

Atty. Docket No. _____ USW# 1674
60,434-002

Inventors: Donald Gillespie, Jafar Nabkel,
Harvey J. Benson, Karen Siegel-Jacobs, Edward A. Youngs

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND SYSTEM FOR PROVIDING LOCATION-SENSITIVE CALL MANAGEMENT SERVICES TO A MOBILE SUBSCRIBER

the specification of which:

[X]   is attached hereto; or
[   ]   was filed on (MM/DD/YYYY) _____ as U.S. Application Number or PCT International Application Number _____, and was amended on (MM/DD/YYYY) _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below, and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Priority Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? (Yes/No)

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

Declaration for Patent Application (cont'd.)   Atty. Docket No. USW#1674

60,434-002

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Application Number(s)	Filing Date (MM/DD/YYYY)	Status: Patented, Pending, Abandoned

We hereby appoint the practitioners associated with Customer Number 22193 to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to that Customer Number. Telephone calls should be directed to US West, Inc., Law Department-Intellectual Property Group, at (877) 879-4747 or (303) 672-2700.

||||| ||| |||| || ||| || |||| |||| ||

22193

PATENT TRADEMARK OFFICE

We hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's signature _____

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Full name of Second Inventor　　　Jafar Nabkel

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Full name of Third Inventor　　　Harvey J. Benson

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Residence (same as above) _____ Citizenship ____USA____

[Decl. - Page 2 of 3]

Declaration for Patent Application (cont'd.)

Atty. Docket No. USW#1674
60,434-002

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Inventor's signature _____

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Residence (same as above) _____ Citizenship _____ USA _____

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